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Locked Out: The Unintended Consequences of Phone Activation Locks and How We Can Fix It

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Executive Summary

We live in a world where some of our most prized possessions fit in the palms of our hands. If we are not holding our phones, we usually keep them within sight or touch. But our phones are not only valuable to us; they can be valuable to thieves, who can extract the value from a stolen device in multiple ways. In order to combat phone theft, phone manufacturers have developed the activation lock, a kill switch that, when activated, prevents anyone except the owner from using the phone.

While the activation lock is intended to deter thieves by making stolen phones unusable and therefore not worth stealing in the first place¹, it has also resulted in making a surprisingly high number of donated or handed-down phones unusable², having negative impacts on our environment³ and the used phone marketplace.

If someone does not turn off the activation lock on their phone before they drop their phone in a donation box, their phone can't be reused as a whole device and will be unusable⁴. The phone can be powered on and off by a certified recycler but it will not be allowed to function as another person's phone⁵. Thus, instead of reusing otherwise perfectly reusable phones, they are broken up for their parts.

The Wireless Alliance is an electronics recycling facility located in Lafayette, Colorado that has over 30,000 phone and tablet donation programs across the country. According to The Wireless Alliance, they have received over 66,000 reusable phone that were activation locked iPhones since 2015⁶. These reusable phones were scrapped instead of being reused because of the activation lock. 1 in 4 iPhones they received in 2018 were activation locked, and this proportion is expected to grow with time⁷.

Every phone that can be reused should be reused. If a phone is not being reused, it can end up in the landfill, where it contributes to the fastest growing waste stream in the world. In America, we discard over 416,000 phones per day, approximately 7,800 per day in Colorado⁸. According to the Institute of Electrical and Electronics Engineers, 165 pounds of raw material are required to produce one 8-ounce cell phone⁹. Most of the greenhouse gas emissions associated with cell phones comes from the production of the phone, not the cell phone's use¹⁰.

In addition, for consumers, used devices are often more affordable than newer devices. Even though we have seen major advances in cell phone technology and capabilities over the last two decades, for many Coloradans, a phone that is three to five years old can perform all the functions they need including staying in touch with family, checking the weather, getting directions, watching a video, reading emails, checking the news, and taking a picture.

The most efficient way to keep phones out of landfills and to support a robust used-phone marketplace is to reuse them, but activation locked phones cannot be reused.

There needs to be a way for recyclers to have the activation locks removed from non-stolen phones that are donated to be reused. Unfortunately, there is no current system in place where recycling companies like The Wireless Alliance can flag non-stolen activation locked phones to manufacturers like Apple and Samsung to have the locks turned off so that new consumers can benefit from the perfectly reusable devices their previous owners have tried to pass on. Therefore, if a phone's activation lock is not lifted by the original owner, the lock is permanent.

CoPIRG Foundation recommends manufacturers and recyclers work together to verify donated phones are not stolen and therefore should have the activation lock lifted so it can be used by someone else. For example:

- Recyclers with extensive data security certifications can run phone identification numbers through national databases to check if phones were reported lost or stolen; they can send a list of identification numbers for phones that were not reported lost or stolen within 30 days to the manufacturer who should unlock the devices.
- Manufacturers and recyclers can also set up a consumer-facing verification system where someone who donates an activation locked phone is sent a notification by the manufacturer asking them to verify that they donated their phone; if the consumer presses yes, the phone should be immediately unlocked.

Finally, recyclers and manufacturers can implement more prominent consumer education campaigns to ensure that people know what an activation lock is and how to turn it off before they donate their devices.

The Rise of Phone Activation Locks

We live in a world where some of our most prized possessions fit in the palms of our hands. If we are not holding our phones, we usually keep them within sight or touch. Unfortunately, chances are, you or someone you know has had your phone stolen.

Phone theft is all too common. According to the most recent data analyzed by Consumer Reports, 3.1 million people in America had their phones stolen in 2013.¹¹ In 2012, phone thefts accounted for 20% of robberies in New York City, 33% of robberies in Philadelphia, 38% of robberies in Washington, D.C., and 50% of robberies in San Francisco.¹²

Thieves steal phones because they are valuable in a couple of different ways. While difficult, thieves can access apps like Apple Pay and Samsung Pay and make purchases with that information.¹³ While it takes an extreme amount of effort to bypass the biometric factors necessary to access these apps, those with the time and know-how can use imaging technology to bypass eye recognition software on Samsung devices and fingerprint recognition software on Apple devices.¹⁴ And according to Lookout, 12% of people who had their phones stolen also had fraudulent charges to their financial accounts.¹⁵ Regardless of the difficulty in accomplishing such a task, technology blogs like Lifewire suggest removing your credit and debit cards from your wallet on these apps if your phone gets stolen, to go the extra step in keeping your financial information safe from thieves.¹⁶ The thief can take and use passwords and access your personal information stored in the device. Even when the phone is unusable, thieves can get over \$200 for older devices, like the iPhone 8. If a thief cannot get the price they want with a stolen phone, they can take it apart and sell it for parts, the most valuable of which are the screen and battery.¹⁷

In 2013, in an effort to combat phone theft, law enforcement officials across the country launched the Secure Our Smartphones Initiative to call on tech manufacturing giants like Apple to install a “kill switch” on their devices like phones to reduce their value to thieves and help combat theft.¹⁸ Less than a year later, Apple announced it would be adding such a “kill switch”, known as the Activation Lock or the Find My iPhone (FMI) lock, embedded in the Find My iPhone app, when it rolled out iOS 7.¹⁹ Shortly after, Google and Microsoft rolled out their own kill switches.²⁰ These “kill switches” are commonly called activation locks.

If you have an Apple device, it works like this: when you activate your phone, you can go to your settings and turn on Find My iPhone and the activation lock that lives in it.²¹ It’s an opt-in feature, which means you have to actively decide to turn it on. Once it’s turned on, if your phone is lost or stolen, you can log into your iCloud account and put your phone into Lost Mode. Once in Lost Mode, you can have your device display a personalized message to let others know it is lost or stolen and give them a means to reach you to return the device. Putting your phone in Lost Mode also makes it virtually impossible for a thief to unlock or access your device without knowing the password to your account. Thus, your device becomes a lot less valuable to a thief.

While phone theft is still enough of a problem that we worry about it when we are in coffee shops, libraries, and other public places, the activation lock has made it less likely that each of us will be victims of phone theft. In 2018, San Francisco District Attorney George Gascon stated that cell phone thefts declined by over 50% in the four years since activation locks have been in use.²² Still, phone thefts are too common. In 2018, according to data from the Denver Police Department, 3% of burglaries, over 5% of thefts, and 1 in 4 robberies in Denver involved the victim losing their cell phone.^{23,24} While no study has proven the FMI and other activation locks are the reason for that decline, it is reasonable to assume this extremely effective theft-deterrent is having a positive impact.

Tens of Thousands of Phones Unnecessarily Scrapped

While the activation lock is intended to deter thieves by making stolen phones unusable and therefore not worth stealing in the first place, it has also resulted in making a surprisingly high number of donated or handed-down phones unusable too.

An average phone could easily last five years,²⁵ especially if you fix common problems like cracked screens and drained batteries. Given that we are replacing our phones on average every two years,²⁶ there should be a large and robust market of used cell phones.

One of the ways Americans try to ensure their unwanted phones find a new home is by donating them. One company that collects and then redistributes donated phones to end-of-line recyclers and vetted resellers is The Wireless Alliance based in Lafayette, Colorado. The Wireless Alliance is an R2 certified electronics recycling center, which means that they adhere to strict environmental, occupational health, and data security standards.²⁷

According to data provided to CoPIRG Foundation from The Wireless Alliance, they received more than 6 million donated cell phones from 2015-2018.²⁸ Most of their phones arrive via donation boxes that The Wireless Alliance provides to schools, churches, businesses or organizations across the country. Once the box is full, it's shipped to The Wireless Alliance for processing. For more on their system, go to www.thewirelessalliance.com. There are hundreds of companies and organizations in America with similar models.²⁹

Unfortunately, if someone does not turn off the activation lock on their phone before they drop their phone in the donation box, their phone can't be reused as a whole device and will be unusable. The phone can be powered on and off by The Wireless Alliance employees, but it will not be allowed to function as another person's phone. The Wireless Alliance and other organizations and businesses that use drop boxes have virtually no way to contact every person who donates a phone to let them know that they forgot to turn off the activation lock or ask them to turn it off. Thus, instead of reusing otherwise perfectly reusable phones, they are broken up for their parts.

Tens of thousands of otherwise good phones are junked and recycled each year because of the activation locks. According to The Wireless Alliance, over the course of the last three years, they received over 66,000 iPhones that still have the activation lock turned on and can't be reused.³⁰ Last year alone, they noted that 1 in 4 iPhones they received still had the activation lock enabled.³¹ They note that the total number of FMI locked iPhones they received, as well as the proportion of iPhones they receive that are still FMI locked, has been steadily increasing over time, which means this number will likely grow.³² They also received activation locked Samsung phones.

Reuse Before Recycle

66,000 phones is a lot of phones, and ensuring that these phones can be reused in an open, robust used cell phone market would have a number of big benefits for individual consumers and society as a whole.

For consumers, used devices are often more affordable than newer devices. Even though we have seen major advances in cell phone technology and capabilities over the last two decades, for many Coloradans, a phone that is three to five years old can perform all the functions they need including staying in touch with family, checking the weather, getting directions, watching a video, reading emails, checking the news, and taking a picture.

Additionally, reducing the number of unnecessary new phones we produce has big impacts on our environment and quality of life. Carbon emissions are a leading contributor to climate change. Over 80% of carbon emissions from the iPhone X come from manufacturing and shipping the phone to the store,³³ not in using the phone. In addition, the Institute of Electrical and Electronics Engineers estimates that we produce 165 pounds of waste to mine all of the raw materials that go into one smartphone.³⁴

A robust used cell phone market helps save people money by offering used options and could also reflect what consumers truly intend to do with devices they purchase when they donate their phones to a group like The Wireless Alliance. In this case, the activation lock would interfere with their intent for the device to be reused, rendering the device only usable for parts. After a consumer willingly donates their device, we should not allow barriers to stand in the way of the consumer's intent. This currently happens with donated devices that still have enabled activation locks.

Therefore, both for our pocketbooks and our environment, we should not unnecessarily discard phones that can be reused, especially when consumers clearly intended to send their phones to a new home via companies like The Wireless Alliance.

Donated Stolen Devices?

It seems unlikely that a thief would steal someone's phone and place it in a donation bin when that thief can sell locked iPhones, even older models like the iPhone 8, on the black market for over \$200.³⁵ The Wireless Alliance checked to see if they were receiving stolen devices. They did a random test of 100 iPhones that they received since January 2019. They ran the phones' International Mobile Equipment Identity (IMEI) numbers against national, carrier, and Apple databases. Every phone has a unique IMEI number, so carriers, law enforcement, and manufacturers can identify and track each device. Of these devices, 6 were reported as Lost with Apple using the FMI lock, and 2 were reported as Stolen with their carrier.³⁶

Lost can be interpreted in a few ways. Reporting your phone as Lost could mean that it was stolen. It could also mean that someone misplaced their phone, replaced it, and then found it later. For example, you could go into your attic to get an old lamp and leave your iPhone in a box. Later in the day, you notice that your phone is not in any of the usual places. You could turn on Find My iPhone and put it in Lost Mode, and contact your carrier or Apple to get a new device. Any time later, you or someone else could go back to the attic to return the old lamp and find your old phone. At this point, you have already replaced it and now have an extra phone. You could drop the old phone off at a donation bin without remembering to turn it off Lost Mode. Therefore, some of the Lost phones received by The Wireless Alliance could have actually been found by their original owners and donated.

Based on this sampling and the fact that thieves can sell even locked phones for money, we conclude that the vast majority of phones donated to companies like Wireless Alliance are not actually stolen.

Recommendations - Tackle the Problem of Permanence

There is no current system in place where companies like The Wireless Alliance can flag non-stolen activation locked phones to manufacturers like Apple and Samsung to have the locks turned off so that new consumers can benefit from the perfectly reusable devices their previous owners have tried to pass on. Therefore, if a phone's activation lock is not lifted by the original owner, the lock is permanent.

In order to address this problem of permanence, there needs to be a balance between using effective anti-theft measures like activation locks to deter criminals and lifting activation locks for reputable cell phone recyclers like The Wireless Alliance that receive many locked devices to be reused. The problem is not that there are activation locks protecting people's valuable phones and what is stored within them. The problem is that the activation locks are so permanent that there is no system to remove them at the scale that electronics recyclers operate on, even if the phones are reusable. Activation locks are too permanent, costing consumers money by undermining the used cell phone marketplace and negatively impacting society by unnecessarily requiring the production of new cell phones.

CoPIRG Foundation offers the following recommendations:

First, electronics recyclers with certifications like the R2 certification and manufacturers should work together to develop a system where non-stolen cell phones are unlocked and reused. This can be done in at least two ways:

1. Companies like The Wireless Alliance can run activation locked phone IMEI numbers through carrier, manufacturer, or national databases to check if they are stolen. For any that have not been reported Lost or Stolen and are older than 30 days, the IMEI number should be sent to the manufacturer like Apple or Samsung and they should unlock it, allowing it to be reused. Any that have been stolen should be turned over to law enforcement or returned to the original owner either by the recycler or the manufacturer.
2. Companies like The Wireless Alliance can submit International Mobile Equipment Identity (IMEI) numbers to manufacturers like Apple or Samsung on a regular basis and have the manufacturer send an email or push notification to the original owner's current device verifying that their phone was donated. Any phones that customers positively verify should have their activation lock immediately removed. Any phones that were stolen should be immediately sent to the phone's rightful owner or to law enforcement. If the owner does not respond after 30 days, the lock should be removed and the phone reused.

Second, consumers who are planning to donate their phones should be better educated.

While this will not fully solve the problem of donated locked phones, it can help. Makers of cell phones with activation locks should make it clear to new purchasers that the activation lock must be removed if they ever choose to donate or pass down their phone. Companies like The Wireless Alliance should identify ways to warn consumers on their donation boxes to remove the activation lock.

Conclusion

Donating your phone can make a difference in a number of ways, and consumers should be applauded for taking this action. It can provide a used option for Coloradans who can't afford or don't want a brand new phone. It's also good for the environment because it keeps the phone out of the landfill. Because electronic waste is the fastest-growing waste stream across the world, it is important to make sure that we do everything we can to stem the flow of technology that goes into the trash.³⁷

However, if we forget to turn off the activation lock before we place our phone in a donation bin, we are currently preventing the phone from having a new life and being used by someone else. By working together, phone manufacturers and recyclers can ensure that tens of thousands of

phones that are intended to be reused for the good of society, are reused. This can save people money and reduce the environmental costs of producing unnecessary phones.

End Notes

1. New York Office of the Attorney General, 2013. Secure Our Smartphones Initiative Statement. <https://ag.ny.gov/sos/secure-our-smartphones-initiative-statement>
2. The Wireless Alliance, 2019. Personal communication.
3. Proctor, Nathan. WBUR, December 11, 2018. Americans Toss 151 Million Phones A Year. What if We Could Repair Them? <https://www.wbur.org/cognoscenti/2018/12/11/right-to-repair-nathan-proctor>
4. The Wireless Alliance, 2019. Personal communication.
5. The Wireless Alliance, 2019. Personal communication.
6. The Wireless Alliance, 2019. Personal communication.
7. The Wireless Alliance, 2019. Personal communication.
8. Proctor, Nathan. WBUR, December 11, 2018. Americans Toss 151 Million Phones A Year. What if We Could Repair Them? <https://www.wbur.org/cognoscenti/2018/12/11/right-to-repair-nathan-proctor>
9. iFixit.org 2019, Electronics Manufacturing Eats a Hole in the Earth Every Day <https://ifixit.org/manufacturing>
10. Apple, 2017. iPhone X Environmental Report. https://images.apple.com/environment/pdf/products/iphone/iPhone_X_PER_sept2017.pdf
11. Consumer Reports, April 7, 2014. "3.1 Million Smartphones Were Stolen In 2013, Nearly Double The Year Before". <https://www.consumerreports.org/media-room/press-releases/2014/04/my-entry-1/>
12. New York Office of the Attorney General, June 13, 2013. Secure Our Smartphones Initiative Statement. <https://ag.ny.gov/sos/secure-our-smartphones-initiative-statement>
13. Porche, Brady. Creditcards.com, December 14, 2017. 3 major mobile payment security risks, and how to avoid them. <https://www.creditcards.com/credit-card-news/mobile-payment-security-risks.php>
14. Gartenberg, Chaim, The Verge, May 23, 2017. Hacker beats Galaxy S8 iris scanner using an IR image and a contact lens. <https://www.theverge.com/circuitbreaker/2017/5/23/15680268/hacker-galaxy-s8-iris-scanner-ir-image-contact-lens-starbug>
15. Lookout, May 7, 2014. Phone Theft in America: What really happens when your phone gets grabbed. <https://blog.lookout.com/phone-theft-in-america>
16. Costello, Sam. Lifewire, February 4, 2019. How to protect data on lost or stolen iPhone. <https://www.lifewire.com/protect-data-on-lost-stolen-phone-2000298>
17. Bates, Andrew. The Wireless Alliance, 2019. Personal Communication.
18. New York Office of the Attorney General, 2013. Secure Our Smartphones Initiative Statement. <https://ag.ny.gov/sos/secure-our-smartphones-initiative-statement>
19. New York Office of the Attorney General, 2014. A.G. Schneiderman Statement on the Release on Apple's iPhone 6. <https://ag.ny.gov/press-release/ag-schneiderman-statement-release-apples-iphone-6>
20. New York Office of the Attorney General, 2014. A.G. Schneiderman Statement on the Release on Apple's iPhone 6. <https://ag.ny.gov/press-release/ag-schneiderman-statement-release-apples-iphone-6>
21. Apple, 2019. Set up Find My iPhone on all of your devices. <https://support.apple.com/en-us/HT205362>
22. CBSLocal, 2018. Despite Anti-Theft Measures, Thieves Still Seek Out iPhones. <http://cbslocal.com/2018/01/31/despite-anti-theft-features-thieves-seek-out-iphones/>
23. Denver Police Department, 2019. Open Data Catalog: Crime, 2018 Data. <https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-crime>

24. Denver Police Department, 2019. Personal communication.
25. Consumer Technology Association, 2014. The Life Expectancy of Electronics.
<https://www.cta.tech/News/Blog/Articles/2014/September/The-Life-Expectancy-of-Electronics.aspx>
26. Business Insider, 2017. People are holding onto their smartphones longer.
<https://www.businessinsider.com/how-long-people-wait-to-upgrade-phones-chart-2017-3>
27. Sustainable Electronics Recycling Initiative, 2019. R2:2013, The Responsible Recycling (“R2”) Standard for Electronics Recyclers
<https://sustainableelectronics.org/sites/default/files/R2-2013%20Standard%20%5BENGLISH%5D.pdf>
28. The Wireless Alliance, 2019. Personal communication.
29. Sustainable Electronics Recycling International, 2019. Find a Recycler, American Recyclers.
<https://sustainableelectronics.org/recyclers?location=167356>
30. The Wireless Alliance, 2019. Personal communication.
31. The Wireless Alliance, 2019. Personal communication.
32. The Wireless Alliance, 2019. Personal communication.
33. Apple, 2017. iPhone X Environmental Report.
https://images.apple.com/environment/pdf/products/iphone/iPhone_X_PER_sept2017.pdf
34. iFixit.org 2019, Electronics Manufacturing Eats a Hole in the Earth Every Day
<https://ifixit.org/manufacturing>
35. CBSLocal, 2018. Despite Anti-Theft Measures, Thieves Still Seek Out iPhones.
<http://cbslocal.com/2018/01/31/despite-anti-theft-features-thieves-seek-out-iphones/>
36. The Wireless Alliance, 2019. Personal communication.
37. World Economic Forum, 2018. How do we tackle the fastest growing waste stream on the planet?
<https://www.weforum.org/agenda/2018/02/how-do-we-tackle-the-fastest-growing-waste-stream-on-the-planet/>